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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,037	01/20/2004	Zohar Bogin	42P18575	3941

8791 7590 01/26/2007  
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EXAMINER
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SUN, SCOTT C

ART UNIT	PAPER NUMBER
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2182

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/26/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/762,037	<b>Applicant(s)</b> BOGIN ET AL.	
	<b>Examiner</b> Scott Sun	<b>Art Unit</b> 2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 21-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/28/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 21-29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11/2/2006.

### *Claim Rejections - 35 USC § 101*

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 8-12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Specifically, the claims are directed to a "machine-accessible medium" which, according to applicant's disclosure, includes non-statutory subject matter of propagated signals (carrier waves, infrared signals, digital signals, etc; paragraph 19). Examiner suggests amending the claim to recite "a machine-readable storage medium".
4. To expedite a complete examination of the instant application, the claim(s) rejected under 35 USC 101 (nonstatutory) above are further rejected as set forth below in anticipation of applicant amending these claims to place them within the four statutory categories of invention.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Kurth (PG PUB # US2003/0177296).

7. Regarding claim 1, Kurth discloses a method (method shown in figures 4) comprising:

dynamically modifying one or more attributes (select priority level; step 400) of each of a plurality of requests (work requests from the multiple agents shown in figure 1) to access one or more memory devices (SRAM or FIFO; paragraph 15);  
and  
arbitrating among the plurality of requests to select a request to send to the one or more memory devices in a time slot based on the one or more attributes (step 402, 404; paragraph 21);

8. Regarding claim 2, Kurth discloses the method of claim 1 and further discloses wherein dynamically modifying the one or more attributes comprises dynamically prioritizing the plurality of requests in response to latency sensitivity (relative wait time of

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the requests) of each of the plurality of requests (methods shown in figures 5A and 5B; detail in paragraphs 22, 23). Examiner notes that Kurth teaches priorities of the requests are changed depending the fullness of the queue holding the requests. If the queue is relatively full (resulting in longer wait time for the request), then a high priority is given. Similarly, if the queue is relatively empty (resulting in shorter wait time for the request), then a low priority is given. This prevents any request from being starved (extremely long wait time).

9. Regarding claim 3, Kurth discloses the method of claim 2, and further discloses wherein the latency sensitivity of each of the plurality of requests changes in response to space available in a buffer storing the corresponding request (paragraph 22 and 23).

10. Regarding claim 13, Kurth discloses the various features as shown in rejection of claim 1, and further discloses a plurality of memory access controllers (agents 130 A, B, C shown in figure 1) and an arbiter (arbiter 102).

### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 4, 8-10, and 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurth further in view of Odman (PG Pub # US2003/0210710).

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13. Regarding claim 4, 8, and 14, Kurth discloses various elements as shown in rejection of claims 1 and 13, but does not disclose explicitly dynamically changing lengths of the requests. However, Odman discloses combining multiple requests (frames or fragments) into a larger request (a burst transfer) to fill a given time slot (paragraphs 93, 97). Teachings of Kurth and Odman are from the same field of data transmission, and specifically of transfer scheduling.

Therefore, it would have been obvious at the time of invention for a person of ordinary skill in the art to combine teachings of Kurth and Odman by combining multiple smaller requests into larger requests to fill time slots for the benefit of reducing wasted bandwidth (paragraph 93).

14. Regarding claim 9, 10, and 20, examiner notes that these claims contain limitations substantially to those in claims 2 and 3. The same reasoning used in above rejections are applied.

15. Regarding claims 15 and 16, Kurth and Odman combined disclose claim 14, but does not disclose explicitly using multiplexers and flip-flops. However, examiner notes that multiplexers and flip-flops are well-known and basic logic elements used to implement computer logic. Given the teachings of Kurth and Odman, it would have been an obvious choice at the time of invention to use these elements to implement the logic disclosed by Kurth and Odman for the benefit of simple and efficient logic design.

16. Regarding claim 17, Kurth discloses claim 13 and further discloses the first arbiter comprises a first plurality of arbiters (round robin) and a second arbiter (fixed priority), outputs of the first plurality of arbiters are coupled to inputs of the second

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arbiter (paragraph 17). Examiner notes that Kurth discloses that round robin is used for requests having the same priority, and fixed priority arbiter is used for requests of different priorities.

17. Regarding claim 18, Kurth discloses claim 13, but does not disclose explicitly that the first plurality of arbiters comprises a plurality of FCFS arbiters. However, Kurth discloses that alternative arbiters can be used instead of round robin (paragraph 26). FCFS arbiters would have been an obvious design choice at the time of invention for the benefit of providing fairness in servicing the requests in time of arrival.

18. Regarding claim 19, Kurth discloses claim 19, and further discloses wherein the second arbiter comprises a fixed priority arbiter (paragraph 17).

19. Claims 5, 6, 11, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurth in view of applicant's admitted prior art (APA).

20. Regarding claims 5, 6, 11, and 12, Kurth discloses claims 1 and 8, but does not disclose explicitly the request types. However, applicant's admitted prior art discloses the requests can be read, write or buffer descriptor read requests (memory access requests according to the PCI Express protocol, which includes data read, data write, and buffer descriptor read requests). Teachings of Kurth and applicant's admitted prior art are from the same field of data transfers between computer components, and specifically of scheduling requests.

Therefore, it would have been obvious at the time of invention for a person of ordinary skill in the art to combine teachings of Kurth and APA by using the method

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disclosed by Kurth in a PCI Express protocol environment for the benefit of fair request arbitration (paragraph 7, Kurth; paragraph 4, APA).

21. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurth in view of Somers et al (PG Pub # US2002/0116555).

22. Regarding claim 7, Kurth discloses claim 1 but does not disclose explicitly a plurality of DMA controllers. However, Somers discloses a plurality of DMA controllers for handling data transfers (paragraph 3). Teachings of Somers and Kurth are from the same area of data transmissions between computer components.

Therefore, it would have been obvious at the time of invention for a person of ordinary skill in the art to combine teachings of Kurth and Somers by using a plurality of DMA controllers to assert access requests for the benefit of efficient data transfer (paragraph 3, Somers).

### ***Conclusion***

23. Other publications are cited to further show the state of the art with respect to request priority and length modification. Refer to form 892, "Notice of References Cited", for a complete list of relevant prior arts cited by the examiner.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Sun whose telephone number is (571) 272-2675. The examiner can normally be reached on M-F, 10:30am-7pm.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim N. Huynh can be reached on (571) 272-4147. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SS



KIM HUYNH  
SUPERVISORY PATENT EXAMINER

1/22/06